

Application No.: 10/820,798

Docket No.: 21581-00320-US1

In the Specification

Please amend the specification as follows:

Please amend the paragraph beginning at page 1, line 14 to read:

"Cement paste in which water is added to cement, mortar in which sand as fine aggregate is mixed into the cement paste, and concrete having fluidity improved by a dispersant, in which gravel as coarse aggregate is further mixed into the mortar have been used in great quantities for various structural materials and the like. In such concrete, concrete products (precast concrete) have been in increasing demand mainly in Europe and America. Concrete products are made by pouring concrete into a formwork in factories, and concrete members thus made are carried to a building site and constructed. In a method of producing such concrete products, deforming from a formwork in early stages is required for the purpose of improving productivity in factories, and an usual dispersant causes a high degree of ~~hardening-retardation~~ hardening-retardation and needs a long time until deforming. Steam curing is generally performed in factories, also in which case increasing the turnover of a formwork and improving productivity is required. Standard processes of steam curing are as follows. That is, concrete is poured into a formwork and compacted to thereafter stand as pre-curing at ordinary temperature for approximately 2 to 4 hours. Subsequently, vapor starts to be ventilated and the concrete is heated up by a heating-up temperature of 15 to 20°C/hour (in general, 20°C/hour or less). Typically, after reaching a curing temperature of approximately 50 to 80°C, isothermal curing is performed while maintaining the temperature for 2 to 4 hours to thereafter stop the ventilation of vapor, and the curing ends through a slow cooling period by natural standing to cool. Deforming from the formwork is performed during this slow cooling period to divert the formwork to next producing cycle. Also, a manner such as to cover the periphery of a formwork with a heat insulator (an isolating material) is occasionally adopted as a method for increasing the turnover of a formwork except steam curing. This allows time for deforming to be shortened by utilizing self-heat of hydration of cement to promptly raise the temperature in the system."

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Please amend the paragraph beginning at page 2, line 14 to read:

"Further, an improvement in durability and strength of concrete buildings have been greatly required in the recent concrete industry, and a reduction in the unit water content ~~have~~ has been an important problem for achieving this improvement. In addition, mortar and concrete is hardened by the progress with time of hydration reaction between cement and water, so that slump loss is generally inevitable, which is a phenomenon of the deterioration of fluidity with time passing after adding water. Accordingly, a dispersant has been required, which allows the dispersing ability of cement to be held and is suitable for producing a concrete product."

Please amend the paragraph beginning at page 6, line 7 to read:

"In the course of investigations made by them in search of a polycarboxylic acid cement dispersant, the present inventors found out that a copolymer of methacrylic acid and methacrylate of polyalkylene glycol (ethylene oxide (EO) chain length is 25 mol or less) exhibits a high dispersing ability and that such a dispersant is useful for manufacturing concrete or the like. The present inventors have also found out that strength in early stages is improved, in other words, the degree of hardening-retardation is reduced by using a polycarboxylic acid cement dispersant which provides a cement composition having a penetration resistance value exponent of 55 MPa or more and a slump retention exponent of 80% or more, and by rendering a main chain skeleton acrylic to lengthen alkylene oxide (AO) chain length in ester, particularly, ethylene oxide (EO) chain length in ester, and consequently they came to realize that the above-mentioned object can thus be successfully accomplished. Typically, the function of a polycarboxylic acid cement dispersant inhibits the hydration of cement particles to improve fluidity; however, by means of rendering a main chain skeleton acrylic to lengthen ethylene oxide (EO) chain length in ester, the synergistic function thereof improves hydrophilicity of the copolymer, resulting in moderately easy hydration of cement particles and allowing deforming in early stages in the case of producing concrete products, whereby the turnover of a formwork is increased so as to improve productivity. In addition, it is forecast that a

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smaller carbon number of a terminal alkyl group in ester improves the hydrophilicity of the copolymer, and a similar effect of improving productivity can be expected.”

Please amend the paragraph beginning at page 6, line 35 to read:

“In the course of investigations made by them in search of a method of producing a concrete product, the present inventors paid attention to the fact that when a copolymer introduced by using a polyalkylene glycol unsaturated monomer, an unsaturated carboxylic acid monomer and a sulfonic group-containing monomer is used as a dispersant, a concrete product exhibiting a high dispersing ability can be manufactured, and they found that when making the mass ratio of the sulfonic group-containing monomer relative to total monomer components into 0.1% by mass or more and 35% by mass or less with the structure of these monomers specified, strength in early stages of the concrete product is improved, in other words, the degree of hardening-retardation is reduced. Such findings have now led to completion of the present invention. When the above-mentioned mass ratio exceeds 35% by mass, sufficient water-reducing performance and dispersing ability may be not obtained, resulting in the need to increase the quantity added of the copolymer to a cement composition. In this case, the quantity of the copolymer attached to cement particles is increased so as to inhibit the hydration reaction of cement particles and not sufficiently improve strength in early stages. Further, when the above-mentioned mass ratio is less than 0.1% by mass, strength in early stages are also sufficiently improved. Therefore, by means of making the mass ratio of the sulfonic group-containing monomer relative to total monomer components forming the above-mentioned copolymer into 0.1% by mass or more and 35% by mass or less, cement particles are easily hydrated in moderation to allow deforming in early stages, whereby a concrete product can be produced such that the turnover of a formwork is increased so as to improve productivity.”

Please amend the paragraph beginning at page 7, line 35 to read:

“The present invention is also also concerned with a method of producing a concrete product

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which comprises a process of curing under a condition of a temperature of 30°C or more, using the polycarboxylic acid cement dispersant.”

Please amend the paragraph beginning at page 8, line 5 to read:

“The present invention is also related to a method of producing a concrete product”

Please amend the paragraph beginning at page 8, line 10 to read:

“The present invention is also concerned with a method of producing a concrete product”

Please amend the paragraph beginning at page 25, line 27 to read:

“The curing temperature is preferably 30°C or more and 250°C or less, more preferably 50°C to 200°C. The whole concrete does not need to be in this temperature range and it is sufficient that a portion at the highest temperature in the concrete is in the above-mentioned temperature range during curing period. When the curing temperature is lower than 30°C, a long time for deforming is needed, when the curing temperature is higher than 250°C, a crack in concrete products is caused and this is not desired ~~it is~~ ~~unpreferable~~.”